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#4  
17 April 2002  
P. Talbot  
INVESTOR IN PEOPLE

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ



I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

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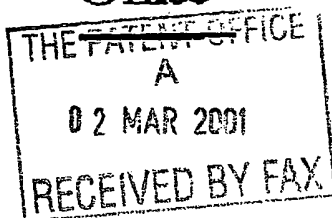
28 January 2002

## Patents Form 1/77

Patent Act 1977  
(Rule 16)The  
Patent  
Office02MAR01 E61026-1 D0268  
P01/7700 0.00 105126.7

1/77

## Request for grant of a patent

*(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form).*

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

|   |  |   |  |                                 |
|---|--|---|--|---------------------------------|
| 1.  | Your reference   | EAL/AH-P/6097.GBA   |  |                                 |
| 2.  | Patent application number<br>(The Patent Office will fill in this part)  | 0105126.7   |  | 2 MAR 2001                      |
| 3.  | Full name, address and postcode of the or of each applicant (underline all surnames)   | LAND INSTRUMENTS INTERNATIONAL LIMITED<br>Dronfield<br>Sheffield S18 6DJ<br><br>39790 69001 |  |                                 |
| Patents ADP number (if you know it)   |  |   |  |                                 |
| If the applicant is a corporate body, give the country/state of its incorporation                               |  | GB  |  |                                 |
| 4.  | Title of the invention   | GAS SAMPLE PROBE FOR A GAS ANALYSER   |  |                                 |
| 5.  | Name of your agent (if you have one)   | Hulse & Co  |  |                                 |
| "Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode) |  | St James House,<br>8th Floor<br>Vicar Lane<br>Sheffield S1 2EX                              |  |                                 |
| Patents ADP number (if you know it)   |  | 885002  |  |                                 |
| 6.  | If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number  | Country   | Priority application number (if you know it) | Date of filing (day/month/year) |
| 7.  | If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application   | Number of earlier application   |  | Date of filing (day/month/year) |
| 8.  | Is a statement of inventorship and the right to grant of a patent required in support of this request? (Answer 'Yes' if:<br>a) any applicant named in part 3 is not an inventor, or<br>b) there is an inventor who is not named as an applicant, or<br>c) any named applicant is a corporate body.<br>See note (d)). | YES   |  |                                 |

## Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description 2

Claim(s) -

Abstract -

Drawing(s) 1 sheet (informal) *10 1 sheet*

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of Inventorship and right to grant of a patent (*Patents Form 7/77*)Request for preliminary examination and search (*Patents Form 9/99*)Request for substantive examination (*Patents Form 10/77*)Any other documents  
(*please specify*)

11.

I/We request the grant of patent on the basis of this application.

Signature

Date

2 March 2001

AS AGENTS FOR THE  
APPLICANT

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr E A LONG

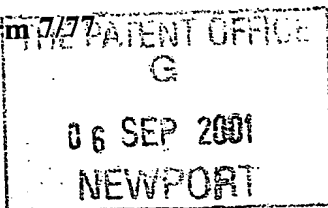
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The  
Patent  
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7/77

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**Statement of inventorship and of  
right to grant a patent**

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

|    |   |  |
|----|---|--|
| 1. | Your reference  | EAL/AH-P/6097.GBA  |
| 2. | Patent application number<br>(if you know it)   | 0105126.7  |
| 3. | Full name of the or of each applicant   | LAND INSTRUMENTS INTERNATIONAL LIMITED                                       |
| 4. | Title of Invention  | GAS SAMPLE PROBE FOR A GAS ANALYSER  |
| 5. | State how the applicant(s) derived the right<br>from the inventor(s) to be granted a patent   | BY VIRTUE OF AN AGREEMENT DATED 27/08/01<br>AND AN ASSIGNMENT DATED 27/08/01 |
| 6. | How many, if any, additional Patent Forms<br>7/77 are attached to this form?<br>(see note (c))  | NONE   |
| 7. | I/We believe that the person(s) named over the page (and on<br>any extra copies of this form) is/are the inventor(s) of the invention<br>which the above patent applications relates to |  |
|    | Signature   | Date   |
|    |   | 5 September 2001   |
|    | AGENTS FOR THE APPLICANT  |  |
| 8. | Name and daytime telephone number of<br>person to contact in the United Kingdom   | Mr E A LONG<br>(0114) 276 9381   |

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- When an application does not declare any priority from an earlier UK application, you must provide enough copies of this form so that the Patent Office can send one to each inventor who is not an applicant.
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-1-

**Title of the Invention**

GAS SAMPLE PROBE FOR A GAS ANALYSER

**Field of the Invention**

This invention relates in a first aspect to a gas sample probe for a portable gas analyser,  
5 and in a second aspect to an analyser provided with such a probe.

**Background of the Invention**

Portable gas analysers are known for use in the measurement of the concentration of gas  
in stacks and ducts of industrial processes for the purpose of emissions monitoring, and  
combustion control. In practice, the analyser extracts a small amount of gas from the flue usually  
10 via metal tube mounted in the stack and a length of hose. In order to assure accuracy of  
measurement, it is necessary to remove the water content from the gas, usually by means of a  
cooler. Traditionally such coolers require electrical power (usually mains), are bulky and not very  
practical to use with a portable analysers which are usually battery powered.

**Object of the Invention**

15 A basic object of the invention is the provision of an improved gas sample probe and  
portable gas analyser.

**Summary of a first object of the Invention**

According to a first aspect of the invention, there is provided a gas sample probe for a  
portable gas analyser, where the probe comprises an integral cooler or chiller operable by means  
20 other than electrical power, through which cooler or chiller the gas sample is passed prior to being  
conveyed to a gas analyser.

**Summary of a second aspect of the Invention**

According to a second aspect of the invention, there is provided a battery powered, portable  
gas analyser in combination with a probe in accordance with the first aspect.

25 **Advantage(s) of the Invention**

The integration of a non-electrically powered cooler or chiller into the probe firstly ensures  
that the required removal of water vapour from the gas sample may be satisfactorily achieved

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before the sample is introduced into the analyser, thereby avoiding inaccurate analysis due to the presence of water vapour, and secondly ensures that there is neither a drain on the battery capacity nor a requirement for increased battery capacity for activation of the cooler or chiller, whilst the rate and volume of gas flow through the cooler or chiller can be readily adjusted on site, by known control techniques, to ensure that for whatever gas temperature is involved - which will of course vary from site to site - there is sufficient dwell time of the gas sample within the cooler or chiller, for the dew point to be attained, so that the gas sample is then left "dry", allowing the analyser to make a true "dry" measurement.

#### **Preferred or optional features of the invention**

10           The cooler is attached to an industry-standard sample probe.

The cooler forms the handle of the sample probe and a connection is provided for a hose to transfer the gas sample to the gas analyser.

The cooler comprises a vessel adopted to contain a measure of crystals to which tap water is then added to initiate an endothermic chemical reaction.

15           The crystals are of potassium bromide.

The vessel also houses an expansion chamber for the gas sample, the chamber having an inlet, and an outlet for the gas sample, and the chamber being subjected to the cooling effect of the endothermic reaction, whereby sufficient heat is removed from the gas sample flowing through the chamber to attain the dew point.

20           A catch pot is associated with the expansion chamber to collect water that is condensed out of the gas sample by lowering of the temperature of the gas sample through its dew point.

#### **Drawing**

One example of probe in accordance with the first aspect is shown in the accompanying diagrammatic drawing.

1/1 INFORMAZ

